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FEDERAL COMMUNICATIONS COMMISSION
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CC DOCKET 98-146

COMMENTS OF NEW WORLD PARADIGM, LTD. & KHAM SIN
TECHNOLOGIES

SUMMARY

Lack of technology is the basic cause for the shortage of advanced telecommunications capability. The last mile's technical problems have thus far prevented such capability from being distributed to all Americans. New World Paradigm, Ltd. & Khamsin Technologies have solved the technical problems and developed a "new last mile", which provides 622 MBPS paths from the home and business to the network and back. The paths are independent of each other -- they do not share each other's capacity. The signals are carried electrically from the home to the network and converted to optical signals. From the network the signals are converted from optical signals to electrical ones. The signals are digital and may represent voice, data and high resolution video streams. The paths use the SONET format, the common standard used worldwide for network communications. Bringing SONET formats directly to the home and business largely erases the distinction between local and global sides of a network. The "new last mile" is patent-pending in the United States and 92 other countries.

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COMMENTS ON CC DOCKET 98-146(FCC 98-187):
NEW WORLD PARADIGM, LTD . & KHAM SIN TECHNOLOGIES

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COMMENTS ON CC DOCKET 98-146(FCC 98-187):

NEW WORLD PARADIGM, LTD. & KHAM SIN TECHNOLOGIES

1. Introduction

New World Paradigm, Ltd. (NWP) and Khamsin Technologies (Khamsin) thank the Federal Communications Commission for its broad and open approach in this proceeding.

The agency set the tone and spirit when it wrote:

This proceeding is concerned with the longer-term future... our inquiry transcends all boundaries among today's industries... We also welcome comment from... research laboratories... We want ideas that are not shaped narrowly by the interests of any incumbents, and presentations from companies that are not traditional telecommunications firms... We call for the aid of all in this great national effort.¹

As inventors and entrepreneurs, we offer our voice in the same spirit and hope our comments convey an additional perspective and incentive to bring about "a more productive, knowledgeable, and cohesive nation."²

¹ See NOI Par. 8, 12 and 86.

² See Par. 1

2) *NWP And Khamsin Believe Lack Of Technology Is The Basic Cause Of A Shortage Of Supply Of Advanced Telecommunications Capability*³ The Agency accurately

characterizes the problems preventing the development and distribution of advanced capability when it says "There are two sets of challenges standing between today and the availability of advanced services to all Americans. The first set is technical... the so-called "last mile" -- is not broad or fast enough to be called "advanced." ... [and] Second, our regulatory system is uneven in its treatment of different technologies."⁴ Several years ago NWP began research to overcome the technical problem in the last mile. We have solved it and believe the solution will affect the regulatory system that the Agency administers.

A) *The Technical Solution.* We have patents pending in this country for a new technology that we believe is the best solution to the technical problem because our "last mile" system does more in one (1) line than what the local telephone loop and the cable TV distribution feeder do in two (2) lines. We integrate the functions of the local loop and the cable feeder into a single digital path to the home and business. By integrate, we mean that digital voice, digital data services and the highest quality digital video services are

³ See Par. 66

⁴ See Par. 3 and 4.

packetized within a SONET format and delivered to and from the home and business through one (1) line at the speed of 622 MBPS in each direction at the same time -- the send and receive paths are symmetric. The paths are separate from each other and do not share capacity with each other.

By integrate, we also mean the "last mile" becomes an integral part of and an extension of the nation's and the world's high speed networks themselves, largely erasing the distinction between the "local" and "global" sides of a network. The "last mile" will no longer be the point where communications speeds nosedive and traffic congests. The last mile's speed and carrying capacity will also enable the cable TV industry to be a full and perhaps senior partner in the national effort to deploy advanced telecommunications services. Our "last mile" integrates telecommunications and cable TV services while showing no cross talk, no electromagnetic interference and no cable transmission losses. This technical achievement distinguishes our "last mile" system from xDSL technology in the local loop and from current technology in the cable TV business because both of them continue to struggle with "interference" and bandwidth, the ever-present problem that causes a shortage of capacity, the essence of advanced telecommunications capability.

By integrate, we mean further that our numbering system stems from the V6 Internet protocol, where 10^{38} numbers, i.e., a "1" with 38 zeros behind it, or a billion-trillion-trillion numbers or Internet addresses or network addresses can be "called" or "addressed"

through our system. There is no number shortage with our protocol, which allows for communication between every device, machine, and business and individual worldwide for the next several generations.

B) Effect on the Regulatory System. In this regard the Agency asks:

We also request comment about the basic legal and regulatory model that will best foster the deployment of advanced telecommunications capability... we use several different models for different industries. These include a "telephone model"... "a cable TV model"... "a broadcast model"... "a resale/UNE" model and a "facilities-based" model... as discrete industries and services begin to converge, the application of different regulatory models to competing services will have effects on the marketplace. We ask for comment on such effects.⁵

We respectfully submit that each model is premised on the idea that spectrum capacity is limited in both the radiated and wired mediums. Spectrum capacity is defined by three factors -- bandwidth, signal-to-noise ratio and spacial separation, the last item important in radiated spectrum. In the wired medium our technology makes spectrum capacity huge. Providing multiple separate paths and eliminating interference makes bandwidth abundant and provides very high signal-to-noise ratios. Here is an example of how the MVPD market could be affected by our technology:

⁵ See Par. 77.

Example. Today a cable TV drop carries into the home all the channels that the provider sends to consumers. During each moment the cable's capacity is being used up by the channels the consumer is not watching as well as the channels the consumer is watching. The channels not watched are not needed but are using up cable capacity. The capacity can be used more efficiently when channels become addresses that can be reached or "called" in an instant by the touch of a button. With addressable television channels the cable drop's capacity is no longer used by the channels that are not being watched. Capacity is used only during the time when a television address is "called." A provider who offers video services which have an address and can be "called" in an instant has the opportunity to expand service offerings far beyond the capacity limits of today's cable system.

Sending information only when it is requested is a different definition of broadband capacity than the suggestions that broadband be defined as:

Facilities with sufficient bandwidth to offer the capability of transporting multiple channels of service or... [the ability] to convey an amount of information in less than a certain amount of time or a rate greater than a certain specific rate.⁶

⁶ See Par. 14

Spectrum abundance alters the MPVD market and telecommunications markets.

Therefore, if the Agency continues to apply regulatory models based only on the scarcity notion the inadvertent result could be the suppression of technologies like ours.

To avoid that result, we believe that the Agency will need a model based on spectrum abundance instead of scarcity to reasonably administer the regulatory system or to deregulate it further. The model may need to encompass the notion that the cost per bit of information is declining at an increasing rate. The model may need to deal with the notion, that in a single huge path to the home, the value and revenue potential of a new "essential facility" reside more in nondiscriminatory access to the path rather than residing in the ownership of the path itself. With nondiscriminatory access to a huge path, competition's focus shifts to a competition between services instead of a competition between facilities.

However, spectrum scarcity in the local loop ultimately limits the benefits of a regulatory strategy that encourages "incumbent LECs to open their networks in ways that allow multiple providers to offer high-bandwidth services."⁷ Until the local loop is physically replaced, the limits⁸ cannot be overcome even if the loop's current owners completely open their networks, divest themselves of it, lease all their dark fiber and comply with

⁷ See NPRM(CC 98-147) Separate Statement Commissioner Susan Ness.

⁸ See NPRM(CC 98-147) Par. 159-176 for the FCC's discussion on loop spectrum.

national uniform standards to connect electronics at the central office end of the local loop.

C) Affordability. In Par. 66 of the NOI the agency asks commenters:

to examine the prospects for development of that technology. Does the technology exist, but not at an affordable price for most or all Americans? Would the price be affordable if a mass consumer acceptance and demand developed, as has been the case over time with long distance and mobile service?

Accordingly, we tell you that the technology exists and that we have a deployment agreement with a service provider. As inventors and entrepreneurs we know that it is fruitless to develop and bring to market a new technology unless it is cheaper than and outperforms the in-place technologies. Therefore, we believe the price is affordable. We think there will be a mass market because consumers are rational and embrace a product when its cost is lower, its quality is better and its service offerings greater than what can be had through a multiplicity of lower speed communications lines. We believe the technology is affordable even though it requires construction. Having said this, it is now appropriate to bring the Agency's attention to its unwarranted assumption in its thinking about new technology and construction.

D) *The Agency Assumes That If Construction Is Required For New Technology, Then New Technology Is "Expensive."* Par. 19 of the NOI describes the current local loop and

says:

For these facilities to provide certain advanced services, they would need either expensive improvement by new last miles, probably consisting of fiber or wireless connections.

New "last miles" are not necessarily expensive improvements. We think our "last mile" is inexpensive because:

- Our new technology is embodied in a cable system that is truly inexpensive to manufacture;
- The cable is composed of electrical paths and single mode fiber optic paths;
- Communication is achieved with electrical paths and inexpensive electrical interfaces at the home and business, while the fiber paths lie dormant until the price of optical interfaces decline to the point where optical interfaces become economical to install at the home and business;
- Our cable has 1 electrical interface at the home, 1 electrical interface at the network node and only 1 optical interface at the node that is shared by 30 to over 100 users, thus minimizing the optical interface's cost on per user basis - much different and more cost effective than having an optical interface at every user's premises;
- Materials are inexpensive and readily available in domestic markets;

- New polymers and new methods of fabrication in manufacturing give our system a very long design life;
- A long life allows for a correspondingly long amortization and depreciation, at the discretion of the provider; and
- Multiple services over a single line allow for a rapidly declining cost per bit, which implies that voice, data and video services provided over (1) line will be far less expensive than providing these service over different physical paths;
- The cable system will seamlessly interface with Firewire, "the last 100 feet; " note that its frame rate is the same as the SONET frame;
- The cable allows all services to be offered all the time, real time or delayed according to the provider's and user's discretion.⁹

The biggest expense we see is construction cost. But any company doing an overbuild faces a construction cost that is not necessarily determined by the nature of the facilities being installed, whether wireless or wired, whether the wire consists of nonzero dispersion fiber optic cables, hybrid fiber-coaxial cables or new "last miles." But if construction is seen as an onerous task, then at the time of construction it makes sense to install the most advanced technology and capability available.

⁹ See <http://www.nwpl.net> for more details.

We point out that a "new last mile" is the only item in the NOI decried as "expensive." The term is not associated with any other technology. We are concerned because the same "expensive" assumption is made in another ongoing proceeding. In CC Docket 98-147 (FCC Docket 98-188), Footnote 46, the Agency says "constructing fiber-based digital loop carrier systems to overcome loop length difficulties, can be expensive." Just like CC 98-146, CC 98-147 describes no other technology as "expensive." The Agency's assumption that the construction of new technology and fiber based systems is expensive is a technology-bias that contradicts the sentiment expressed in the opening paragraph of the NOI:

We intend for advanced technology to have every opportunity to flourish and herein we seek comment on ways to make its deployment more efficient and more inclusive.¹⁰

Neither in this NOI nor in CC Docket 98-147 is there a citation to support the judgment that construction activity makes new technology any more "expensive" than efforts to improve embedded infrastructure. For example, xDSL technology requires labor and materials expenses associated with collocation, loop conditioning, and the installation of DSLAMs. These efforts will surely lead additional cost being incurred for backbone improvements, as already expressed to the Commission in another proceeding.¹¹

¹⁰ See NOI Par. 1.

¹¹ See FCC Bandwidth Forum, Jan. 23, 1997. Trans. PP. 108-109.

Furthermore, there is no evidence in any Commission proceeding that we know of where improving the embedded telecommunications infrastructure with xDSL technology is shown to be more cost effective than new technology, whether it is wireless or wired, when delivering advanced services.

E) *How The Agency Can Give The Private Sector The Confidence To Invest In New High Bandwidth Technologies And To Deploy Them Throughout This Country.*¹²

As a matter of policy the agency should assume that efforts to deploy advanced services through the embedded "last mile" and efforts to deploy advanced services through a "new last mile" are equally expensive. This assumption establishes a level playing field between

FCC Staff (Mr. Pepper): "What percentage of lines or households could be provisioned with ADSL or XDSL without having to significantly upgrade the networks other than just putting on the box in the home and a box in the central office."

Bell Atlantic (Mr. White): "I think you're probably talking 20 to 30 percent could probably be satisfied that way and the rest would require some fiber."

FCC Staff (Mr. Pepper): "So in some ways it's very comparable to the cable industry situation which is basically that someplace between 50 and 70 or 80 percent of households would have to have their basic networks upgraded before you could deploy the latest consumer technologies."

Bell Atlantic (Mr. White): "Right."

¹² See NOI Par. 12

embedded technology and new ones, wired or wireless. If “equally expensive” is adopted as a first principle, the “great national effort” we are all engaged in opens itself to the possibility that the nationwide local communications infrastructure can be rebuilt into a more capable one for the same cost as the embedded one. Rejecting the “equally expensive” proposition raises difficult issues:

1. If rebuilding the nation’s local communications infrastructure is rejected as impossible because it is too expensive, then what evidence in the record supports that assessment?
2. If rebuilding is accepted as a possibility but then eliminated de facto by a policy of deferring construction and national expense until a later date, when should construction be undertaken and what benefits are lost in the interim?
3. If rebuilding is ignored by assuming it will be handled by the market in due course, with the attendant uncertainty and unpredictability, then the Agency should assume the same thing about the embedded infrastructure and refrain from adopting policies to increase “predictability and certainty”¹³ within the embedded technology.

¹³ See NPRM(CC 98-147) Par. 123

In the July 9, 1998 En Banc Hearing on bandwidth, the Commissioners heard two sides of the rebuild issue. Mr. Steven Ghrust of Winstar told the Commissioners:

the incentives ought to be directed towards creating alternative local broadband capacity, because if we don't do that, we'll find ourselves...in an environment where DSL will not meet the demands of the market place. ¹⁴

Mr. Richard Morris of Sprint told the Commissioners:

We don't intend to build down to individual subscribers... we'd rather use what's been paid for in the past, the twisted pair that's out there today or special access circuits that are already available. ¹⁵

We agree with Mr. Ghrust because DSL will not meet the demand for standard video, much less high resolution video. The Agency must consider the building of "new last miles" as one option to deploy advanced communications services. That possibility is foreclosed now. In Par. 15 of the NOI the Agency requests comments on the meaning of "advanced telecommunications capability" and on "how the Commission should evaluate and respond to the expansion of new technologies and their deployment in the market." We do not understand how the Agency can evaluate new technologies when it considers a "new last mile" to be expensive while other options are not. It is in the public interest for

¹⁴ En Banc Hearing, Trans. Page 84, LL. 19-24

¹⁵ En Banc Hearing, Trans. Page 60, LL. 17-20

the Agency to adopt a neutral stance on this issue before making policy for the 21st century. The "equally expensive" proposition provides that neutrality.

F) *Incentives to Build New Last Miles*

Par. 68 of the NOI says:

We are particularly interested in the potential for new entrants to build new last miles to homes and small businesses. What deregulatory and pro-competitive incentives will lead to the deployment of more last miles of advanced telecommunications capability?

We have already explained the importance of the "equally expensive" proposition. If it were accepted by the Agency and carried to policy, then new entrants and their investors will know that the nation's top communications regulatory authority is not opposed to rebuilding the last mile. In addition, all service providers should have the right and opportunity to offer all communications services, whether such services are novel or already being offered by other providers. Given this freedom, competition between new facilities' providers and incumbents should achieve the goal of distributing advanced services to all Americans.

Whether additional incentives and protections are needed depends on how service providers view technical progress. Is it a zero-sum game where "your gains are my losses?" With regard to the telephone industry, the answer is "yes." LCI International's policy paper: "CLEC Access to xDSL Technology,"¹⁶ suggests that incumbents tried to "Fence Off xDSL technology" and keep it to themselves until that claim was rebuffed by the Commission in its August 6th meeting. With regard to the cable TV industry, the answer is also "yes" because some cable providers see the "must carry" DTV provision as forcing them to drop some channels.

When the "zero-sum" attitude prevails, technological progress is burdened with contention and non-cooperation, which must be balanced by rules governing behavior, as indicated in CC 98-147's proposals for such things as collocation and loop spectrum management. Since the service providers and customers using new last miles will have to reach customers and providers still operating on the embedded last mile and vice-versa, existing rules should govern that interaction and be well enforced.

But we do not believe that our new last mile is a zero-sum game. Incumbents could build a new last mile if they wish and have more than ample capacity to offer their own services

¹⁶ CLEC Access to xDSL Technology: A Necessary Predicate for Widespread Competitive Deployment of Broadband Telecommunications Services. LCI International, June 1998. PP. 10,20

as well as everyone else's. The rebuilding of local facilities by the cable TV industry clearly indicates that at least some incumbents see rebuilding as one way to deploy advanced services.

Finally, we point out that the absence of "unbundling" and "access" requirements in the cable TV industry may make our technology more attractive there than in the local telephone industry, which must comply with such requirements.

G) Reasonable and Timely Deployment

The inquiry asks: "Who is able and motivated to deploy advanced services soon, especially to residential consumers?"¹⁷ We believe the new last mile can be built throughout the country in 5 years, provided state and local authorities understand how the technology can benefit their cities, counties, and local economies; provided that business and community leaders also understand. The various difficulties involving tower sightings for PCS networks suggest that local concerns have to be met and dealt with if national infrastructure is to be built in a cooperative and speedy manner.

¹⁷ See NOI Par. 8

Regarding whether deployment today is proceeding in a reasonable and timely manner, the law says:

In the inquiry, the Commission shall determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. If the Commission's determination is negative, it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.

This broad duty is fraught with difficulties, ambiguities and complexities. Therefore, we believe the Agency's decision should be governed by a portion of the Hippocratic Oath: "Do no harm." As we view the situation there is potential for harm because the Agency sees advanced telecommunications capability embodied almost exclusively in efforts to apply xDSL to the embedded last mile. The NOI contains 31 separate references where DSL technology is associated with advanced capability, one reference saying:

Technology affording such increased bandwidth exists, is known as digital subscriber line (DSL), and takes many forms (collectively, xDSL).¹⁸

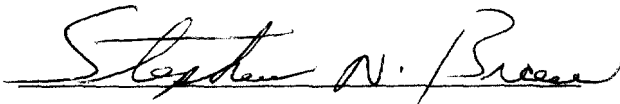
¹⁸ See NOI Par. 20.

It seems the Agency's determination is cast in a near-tautology: The Agency will determine if xDSL technology is being reasonably and timely deployed, and if the determination is negative then xDSL technology is deployed further by removing barriers to investment and promoting competition. But this proceeding is about the longer-term future and the broadband communications services of the 21st century. The Agency will "do no harm" if its decision carries in it incentives to create alternative local broadband capability.

Respectfully Submitted,

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